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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/072,889	02/12/2002	Won-choul Yang	P56603	3560

7590 09/02/2004

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1522 K Street, N.W.  
Washington, DC 20005

EXAMINER

DAVIDSON, DAN

ART UNIT	PAPER NUMBER
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2651

DATE MAILED: 09/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/072,889

Applicant(s)

YANG, WON-CHOUL

Examiner

Dan I Davidson

Art Unit

2651

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 12 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-11, 13-15 and 17 is/are rejected.
- 7) ☒ Claim(s) 7-8, 10, 12-14, 16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

1. The information disclosure statements filed February 12, 2002; June 28, 2002; and November 12, 2002 have been received and have been considered and made of record.

#### ***Priority***

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

#### ***Claim Objections***

3. Claims 8, 10 and 12-14 are objected to because of the following informalities:

(1) In claim 8, line 1, the phrase "may be adjusted" is extraneous.

(2) In claim 10, line 2, a comma should be inserted after "mode".

(3) In claims 12-13, line 2, respectively, "to include" should be modified for the purpose of clarity.

(4) In claim 14, line 2, the phrase "for writing" does not fit well with the claim language.

(5) In claim 14, line 3, the phrase "and parameters" does not fit well with the claim language.

Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-6 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Enarson et al (US 6,078,455 A).

Re claim 1; Enarson et al disclose a method of modifying parameters of a hard disk drive in accordance with ambient temperature (col. 2, lines 50-58), comprising the steps of: updating temperature information by sensing the ambient temperature in a hard disk drive during a particular mode of operation of the hard disk drive (col. 7, lines 59-60; col. 8, lines 55-57; col. 9, lines 1-5); making a determination that an excessive temperature exists when the updated temperature information falls outside of a critical temperature range (col. 7, lines 61-63; the ambient temperature range is viewed by the Examiner as the critical temperature range; the hot temperature range is viewed by the Examiner as where the excessive temperature exists); and when the updated temperature information falls outside of the critical temperature range, changing values of a plurality of write and read parameters influencing performance of the hard disk drive that are affected by thermal variation (col. 9, lines 33-35; Table I, col. 5, line 55 – col. 6, line 8), to compensate for changes in the performance of the hard disk drive due to the excessive temperature (col. 2, lines 49-55), in dependence upon relationships between the write and read parameters and the thermal variation (Table I).

Re claim 2; Enarson et al disclose applying electrical power to functionally operate the hard disk drive during the idle mode (col. 9, lines 2-5).

Re claim 3; Enarson et al disclose updating the temperature information at regular intervals having predetermined periods (col. 8, lines 13-22; col. 8, lines 55-57).

Re claim 4; Enarson et al disclose assigning to each of the parameters a corresponding standard value (Table I; parameters assigned at ambient temperature); applying each standard value during operation of the hard disk drive while the temperature information lies within the critical temperature range; when the updated temperature information falls below a lower limit of the critical temperature range, changing each standard value in dependence upon a low-temperature compensation parameter value; and when the updated temperature information rises above an upper limit of the critical temperature range, changing each standard value in dependence upon a high-temperature compensation parameter value (see Table I).

Re claim 5; Enarson et al disclose responding to the determination that an excessive temperature exists by determining the values in dependence upon an amount by which the updated temperature information exceeds the critical temperature range (col. 5, lines 30-31; given additional temperature ranges as provided for at col. 5, lines 30-31, the values of the parameters will by definition vary depending upon the amount by which the updated temperature information exceeds the critical temperature range).

Re claim 6; Enarson et al disclose that the one or more of the write and read parameters adjusted comprise a write current determination factor, a write booster determination factor and a write precomp factor, and a read bias current factor, when changing the values of the write and read parameters (see parameters in Table I).

Re claim 8; Enarson et al disclose adjusting the values of several of the plurality of write and read parameters together and *en mass*, with adjustment of each of the values of the several parameters being simultaneously adjusted in dependence upon

the excessive temperature and the adjustment of others of the values of the several parameters (Table I; all parameters are adjusted when changing temperature ranges).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 9-11, 13-15, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Enarson et al (US 6,078,455 A).

Re claim 9; Enarson et al disclose an apparatus for determining parameters of a hard disk drive under ambient temperature (col. 2, lines 52-55), comprising: a memory storing information representing a plurality of parameters (col. 7, lines 33-37) that influence performance of the hard disk drive (col. 7, lines 22-23); a temperature sensor disposed to detect the ambient temperature in the hard disk drive (col. 7, lines 59-60); and a controller detecting updated temperature information representing the ambient temperature detected by the temperature sensor during a particular operational mode of the hard disk drive (col. 7, lines 59-60; col. 8, lines 21-22; col. 8, lines 55-57; col. 9, lines 1-5), detecting an excessive temperature by comparing the updated temperature information and a critical temperature range (col. 8, lines 21-24), and compensating for variations in the performance of the disk drive attributable to the excessive temperature (col. 8, lines 26-28) by adjusting values of write and read parameters affected by

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thermal variation to correspond to the excessive temperature (col. 3, lines 4-5) when the updated temperature lies outside of the critical temperature range (col. 8, lines 26-28).

Enarson et al do not disclose that the memory stores temperature information representing ambient temperature in the hard disk drive and updated temperature information representing the ambient temperature detected by the temperature sensor during a particular operational mode of the hard disk drive. In short, Enarson et al do not disclose storing the latest known ambient temperature in a hard disk drive in memory.

Nakazato (JP 02187972) teaches storing a latest detected temperature value (Constitution, lines 5-6). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to store the latest detected temperature value as taught by Nakazato in Enarson et al; motivation being track positioning (see Constitution).

Re claim 10; Enarson et al disclose updating the temperature information while the hard disk drive is in an idle mode, a power-on state with electrical power applied to functionally operate the hard disk drive (col. 9, lines 2-5).

Re claim 11; Enarson et al disclose updating the temperature information that is detected by the temperature sensor at regular intervals each having a predetermined period (col. 8, lines 56-59).

Re claim 13; Enarson et al disclose that the controller determines the values (of the parameters) corresponding to the excessive temperature to include (i.e. in view of) an amount by which the updated temperature information exceeds the critical temperature range (col. 5, lines 30-31; given additional temperature ranges as provided



for at col. 5, lines 30-31, the values of the parameters will by definition vary depending upon the amount by which the updated temperature information exceeds the critical temperature range).

Re claim 14; Enarson et al disclose that the memory stores write and read parameters including a write current determination factor, a write booster determination factor, and a write precomp factor, and a read bias current factor (col. 3, lines 4-7). The phrases "for writing" in line 2, and "and parameters" in line 3 are not understood by the Examiner, and thus are not examined.

Re claim 15; Enarson et al disclose that the memory stores for each of the parameters a corresponding standard value (Table I,  $I_{w2}$ ,  $PC_2$ , etc.); and the controller: applies each of the standard values during operation of the hard disk drive while the temperature information lies within the critical temperature range (i.e. ambient range); when the updated temperature information falls below a lower limit of the critical temperature range, changes each of the standard values in dependence upon a low-temperature compensation parameter value; and when the updated temperature information rises above an upper limit of the critical temperature range, changes each of the standard values in dependence upon a high-temperature compensation parameter value (see Table I).

Re claim 17; Enarson et al disclose that the controller adjusts the values of several of the plurality of write and read parameters by changing the values of the several parameters together and *en mass*, with adjustment of each of the values of the several parameters being simultaneously changed in dependence upon the excessive

temperature and changes of values of others of the several parameters (Table I; all parameters are adjusted when changing temperature ranges).

***Allowable Subject Matter***

8. Claims 7, 12, and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Re claims 7 and 16; the prior art of record, and in particular Enarson et al (US 6,078,455 A), fails to teach or suggest changing the values (of the parameters) by individually adjusting the values of the plurality of write and read parameters independently from one another when the updated temperature falls outside of the critical range.

Re claim 12; the prior art of record, and in particular Enarson et al (US 6,078,455 A), fails to teach or suggest determining the values (of the parameters) corresponding to the excessive temperature to include an amount by which the updated temperature information exceeds the critical temperature range in accordance with an equation.

***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ling et al (US 6,574,061 B1) teach an MR head in which a plurality of temperature ranges are defined with associated bias current values.

Street et al (US 6,266,203 B1) teach optimizing operational performance of a disk drive using a temperature measurement circuit.

Cunningham (US 5,978,163 A) teaches determining an optimal bias level for an MR head in accordance with an ambient temperature.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dan I Davidson whose telephone number is (703) 308-8535. The examiner can normally be reached on Mondays, Tuesdays, and Thursdays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran, can be reached on (703) 305-4040. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

**DID**  
Dan I Davidson  
August 26, 2004

  
**SINH TRAN**  
**PRIMARY EXAMINER**